

A NEW SPECIES OF *OXALIS*

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ABSTRACT

Oxalis illinoensis sp. nov. is described. It ranges throughout the western Interior Low Plateaus physiographic province of North America and has previously been identified as *Oxalis grandis* Small.

The yellow flowered *Oxalis* species of North America (Section Corniculatae) have received much attention over the years. Small (1907) provided a detailed treatment, followed by Wiegand (1925), Eiten (1963) and Lourteig (1979).

In spite of the great amount of attention this group has received, I noticed what appeared to be significant differences between plants I collected from Illinois and western Kentucky and plants I collected in North Carolina, all of which keyed to *Oxalis grandis* Small. None of the monographers mention any geographic variation in this species and I could find no reference in the literature to some of the characters I was seeing.

The most notable character of the Illinois and western Kentucky plants is the fleshy white fusiform tuber which it grows from. *Oxalis grandis* is strongly rhizomatous with no mention of tubers in the literature. In addition, these Illinois and Kentucky plants always lack the brown or purple leaflet margins so typical of *O. grandis*. These differences led me to a closer look at specimens currently identified as *O. grandis*.

Examination of a large series of specimens at the Missouri Botanical Garden confirmed my suspicion that two taxa are included within the material commonly attributed to *O. grandis*. Examination of an additional 33 sheets of *O. grandis* from Vanderbilt University Herbarium confirmed this finding and clarified the distribution of the new taxon which ranges from middle Tennessee northward through western Kentucky to southern Illinois and Indiana. I am naming this new species *Oxalis illinoensis* in honor of the state where its distinctiveness was first noticed.

It is remarkable that this taxon has escaped recognition in a genus that has received so much attention. There are probably several reasons for this. First, there were few, if any, specimens of the new entity available to some of the workers. Secondly, the underground parts, which are a key character, are frequently missing from the collections that are available. The fact that Small (1894) describes the leaflets as "mostly with a brown margin" probably led later workers to disregard the lack of this character when they encountered specimens without them. Finally, variability is characteristic of some species in the section and may have led

to discounting the significance of variation when encountered in *O. grandis*.

On the basis of specimens cited by Small (1894) and Wiegand (1925) it is probable that they saw no material of *O. illinoensis*. The only possibility is the specimen attributed to Mt. Carmel, Illinois (actually from Gibson County, Indiana) collected by Schneck and housed in the Gray Herbarium which I have not seen. Since both *O. grandis* and *O. illinoensis* occur in southern Indiana, this specimen could be of either. Eiten and Lourteig apparently both saw at least some material of *O. illinoensis*.

The primary characters distinguishing *O. illinoensis* from *O. grandis* are the presence of tubers versus rhizomes and the absence of a brown or purple margin on the leaflets. These characters hold up well on the specimens I have examined. One specimen of *O. grandis*, Kral 58442 (VDB) from a shale barren in Bath County, Virginia, has what appear to be tuberous thickenings on some of its elongate rhizomes. However, these are quite different from the single terminal tuber of *O. illinoensis*. In any event these thickenings are not typical of *O. grandis*, this being the only specimen I have observed them on. This specimen also has a strongly cymose inflorescence which is unusual for *O. grandis*.

I do not know the basis of Small's (1894) conclusion that brown leaflet margins were sometimes absent in *O. grandis*. I have not seen *O. grandis* without brown or purple leaflet margins although they are faint and require magnification to confirm in a few specimens. Some specimens from along the edge of the Cumberland Plateau in eastern Tennessee (Blum 3642 Grundy County and Kral 42702 Overton County, both VDB) have very faint coloring suggesting an intermediate form, but they clearly lack tubers.

In addition to the key characters there are several morphological trends which generally, but not always, separate these two species. Relative to *O. grandis*, *O. illinoensis* has larger leaflets which are a paler yellow-green in color and more rounded in shape. Most *O. illinoensis* leaflets have convex margins above the base while concave margins predominate in *Oxalis grandis*. The terminal notches of leaflets of *O. illinoensis* are also shallower and generally less actually angled. Peduncles in *O. grandis* tend to be longer and to arise from more nearly terminal leaf axils thus holding the flowers above the leaves. In *O. illinoensis* the flowers are generally down in the leaves. Using these tendencies it is usually possible to identify rootless specimens without close examination of leaf margins.

The possibility that the presence of tubers, difference in leaf pigmentation and the other morphological trends could be a response to environmental variables exists. Many populations of *O. illinoensis* grow on limestone, shale or calcareous loess substrates. However, plants with *O. illinoensis* traits are limited

to a well circumscribed geographical range and apparently do not crop up throughout the range of *O. grandis* even though calcareous habitats exist there. In Illinois, where I am most familiar with *O. illinoensis* in the field, it is restricted to a series of relatively small mesic forest habitats with limestone substrates in a region of more acid forest soils. It clearly cannot invade these acid soils, a condition I feel is genetically fixed. It apparently does not just happen to grow on limestone, and as a result produce tubers, but rather it must grow in a calcareous habitat.

Oxalis illinoensis appears to be most closely related to *O. grandis* following Eiten's postulated evolution of *Oxalis* Section Corniculatae (Eiten 1963). While *O. illinoensis* would have some difficulty fitting into Subsection Strictae with *O. grandis* in Eiten's key because of its lack of rhizomes, thickened root and absence of a cyme; it clearly belongs close to *O. grandis* on the basis of its septate pubescence, leaflet size, flower size, lack of stipules, presence of stolons and habit.

Oxalis illinoensis probably evolved from *O. grandis* as the latter species adapted to the calcareous mesic forest habitats of the western Interior Low Plateaus physiographic province. Alternatively, it could have diverged directly from *O. stricta* L. (of Eiten 1955) as *O. grandis* is presumed to have arisen. In any event, *O. illinoensis* adapted to a mesic calcareous habitat as opposed to the more acid soils of the Appalachian region occupied by *O. grandis*.

A number of endemic species of very limited range are known from the Interior Low Plateaus province. These include *Oxalis priceae* Small from limestone glades and *Apios priceana* Robins and *Cimicifuga rubifolia* Kearny from mesic forest habitats. *Oxalis illinoensis* frequently grows with the latter species in southern Illinois and western Kentucky. *Oxalis illinoensis* has spread to the Coastal Plain province where it occurs in the calcareous loess-mantled bluffs on the east edge of the Mississippi Alluvial Plain in Carlisle County, Kentucky.

Oxalis illinoensis can be separated from *O. grandis* by the following key:

Plant arising from a white, horizontal, fusiform tuber; colonial by slender stolons; leaflets up to 51mm broad, never with a brown margin, terminal notch acute to almost obsolete; *Oxalis illinoensis*.

Plant colonial from stout rhizomes, tubers lacking; leaflets up to 45mm broad, with a brown margin, terminal notch acute; *Oxalis grandis*.



Figure 1. Documented range of *Oxalis illinoensis*.

Oxalis illinoensis Schwegman sp. nov. Herba perennis tubere albo fusiformi, colonialis stolonibus tenuibus; caules 20-40 cm alti, pubescentes, pilis septatis patentibus; petioli 4.0-7.5 cm longi; foliola 20-51 mm lata, uniforme viridia sine brunneo margine, ciliata ad basim, incisura terminali non profunda et acuta vel prope absenti; flores plerumque 1-3 (-6), in umbellis, petala 9-19 mm longa, sepala 3.5-5.5 mm longa, acuta vel obtusa; capsulae oblongo-ovoideae, 7-10 mm longae, pedunculis non reflexis; semina 1.5-1.8 mm longa.

Specimens examined: Illinois: Pope County (Schwegman 2990, ISM); Pope County (Schwegman 1661, SIU) type; Indiana: Orange County (Mackenzie, MO); Martin County (Palmer 39509, MO); Kentucky: Crittenden County (Athey 513); Lyon County (Athey 487); Carlisle County (Athey 1564); Caldwell County (Palmer, MO); Tennessee: Montgomery County (Palmer 17589, MO); Cheatham County (Palmer 35516, MO); Davidson County (Kral 34675, MO); Williamson County (Waits 47, VDB); Macon County (Kral 55218, VDB); Hickman County (Kral 45648, VDB); Robertson County (Lenham 52, VDB); Sumner County (Blum 3292, VDB); Trousdale County (Kral 49814B, VDB); and Lewis County (Kral 46367, VDB).

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